

Chapter 1

Epidemiology of Suicide and Suicidal Behavior in Youth



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Suicide is the second leading cause of death among youth aged 10–19 years in the United States (Centers for Disease Control and Prevention [CDC], 2020a). Following a steady decline since 1999, suicide rates in this age group increased 47% between 2010 and 2019 (from 4.2 to 6.6 per 100,000) (CDC, 2020b). The loss of a young life to suicide is a tragic event, leaving a lasting and devastating impact on families, friends, and communities. Although research has advanced many effective strategies to prevent youth suicide, continued efforts are needed to address this pressing public health problem.

Suicidal ideation, defined as thoughts of ending one's life, and suicide attempts, nonfatal self-injurious behavior with stated or inferred intent to die, are also common among youth and some of the strongest predictors of future suicide (O'Carroll et al., 1996). According to the 2019 Youth Risk Behavior Survey (YRBS), completed anonymously by US high school students, 1 in 5 youth indicated they had seriously considered suicide, and 1 out of 11 youth reported they attempted suicide at least once in the prior 12 months (CDC, 2020c). These numbers suggest that healthcare systems and schools should not only seek to identify youth at risk for suicide, but they should also be prepared to support them in a timely and compassionate manner. Numerous risk factors are associated with suicide and suicidal

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behavior including individual (e.g., psychopathology, prior suicidal behavior), family (e.g., familial suicide, family discord, child maltreatment), and social (e.g., school/peer-related problems) characteristics (Cha et al., 2018). This chapter will focus on recent developments in the epidemiology of youth suicide including trends in demographic subgroups and related risk factors. Knowledge of the complex interplay of factors contributing to youth suicide is highly relevant to the development of effective prevention strategies. Therefore, this chapter seeks to set a foundation of suicide epidemiology for the other chapters in this volume.

Age/Sex

Developmental differences among youth influence the expression and rates of suicidal thoughts and behaviors. Youth suicide rates increase with age, and males are more likely to die by suicide than females (Fig. 1.1). Between 2000 and 2019, youth suicide rates in males were three times higher than females and represented 77% of all suicide deaths in youth aged 10–19 years (CDC, 2020b). However, recent data reveals a narrowing gap between male and female youth suicide rates and age-related sex disparities, with a larger relative increase in suicide rates among younger youth compared to older youth, especially in females (CDC, 2020b). Suicide rates among youth aged 10–14 years increased 100% between 2010 and 2019 (from 1.3 to 2.6 per 100,000), compared to a 40% increase in youth aged 15–19 years (from 7.5 to 10.5 per 100,000) (CDC, 2020b). Suicide rates in females aged 10–14 years showed the sharpest increase, with rates more than doubling during this timeframe (from 0.9 to 2.0 per 100,000; CDC, 2020b). Data further indicate a shift toward a

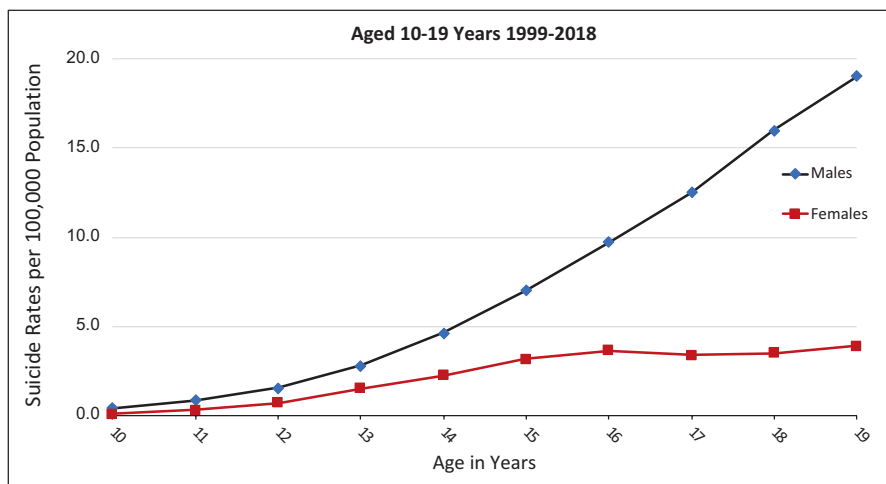


Fig. 1.1 Suicide rates among youth aged 10–19. Suicide rates are displayed by sex (male and female). (Author's own creation)

more highly lethal method of suicide by hanging/suffocation in female youth, which could contribute to the observed increase in female suicide rates (CDC, 2020a). These findings potentially challenge the existing sex-related paradox of youth suicidal behavior, where suicide rates are higher among males than females, yet females have higher rates of suicidal ideation and attempted suicide (Schrijvers et al., 2012).

Race/Ethnicity

Studies also reflect racial and ethnic disparities in rates of suicide and suicidal behavior among youth. American Indian/Alaska Native (AI/AN) youth in the United States have the highest rates of suicide (CDC, 2020b; see also Cwik et al., Chap. 16, this volume). In 2019, the age-adjusted suicide rate among AI/AN youth aged 10–19 years in the United States (23.6 per 100,000) was nearly 3 times the rate for White youth (7.7 per 100,000) and over 4 times higher than rates for Black, Asian/Pacific Islander, and Hispanic youth (CDC, 2020b). Differences by race and ethnicity have also been identified in suicide rates among younger children. An analysis by Bridge et al. (2018) found the suicide rate in children younger than 13 years to be roughly two times higher for Black children compared with White children. An additional study examining suicidal behaviors among US high school students from 1991 to 2017 showed a significant increase in reported suicide attempts by Black youth, while finding no change for White youth, and a significant decrease for all other racial/ethnic groups (Lindsey et al., 2019).

Sexual and Gender Minority Youth

Sexual and gender minority youth are at greater risk for suicide than their peers, even after controlling for other known risk factors (Raifman et al., 2020; Johns et al., 2020; see also Rubin et al., Chap. 13, this volume). Data from the YRBS revealed significantly more sexual minority than heterosexual youth reported suicidal ideation (46.8% vs. 14.5%), a suicide plan (40.2% vs. 12.1%), and at least one suicide attempt (23.4% vs. 6.4%) in the past year (CDC, 2020c). Raifman et al. (2020) evaluated youth sexual orientation and suicide attempts among US high school students and found the proportion of youth reporting any same-sex sexual contact increased by 70%, from 7.7% in 2009 to 13.1% in 2017. Suicide attempt rates decreased in students identifying as sexual minorities during this period, but these students remained more than three times as likely to attempt suicide compared to heterosexual students in 2017 (Raifman et al., 2020). An additional study examined differences in risk and protective factors for suicidal ideation and suicide attempts among sexual minority subgroups in youth aged 12–17 years (Horwitz et al., 2021). Bisexual youth were associated with significantly more suicide risk

factors (depression, trauma, victimization) and less protective factors (parent-family connectedness, positive affect), along with elevated rates of both ideation and attempts compared to heterosexual and other sexual minority youth.

Suicide Method

The most common suicide method among US youth aged 10–19 years has historically been by firearms, followed by hanging/suffocation and self-poisoning (CDC, 2020a). This trend has changed in recent years, partially attributable to increases in rates of suicide by hanging/suffocation. Although suicide rates by hanging/suffocation have increased in both males and females, the most notable increase occurred in females aged 10–14 years, with rates more than doubling from 0.66 per 100,000 in 2010 to 1.4 per 100,000 in 2019 (CDC, 2020b; Ruch et al., 2019). Knowledge of method trends can inform targeted community suicide prevention efforts.

Psychopathology

Although many environmental and social factors contribute to suicide risk, research consistently identifies a significant association between youth suicide and mental health, most commonly anxiety, mood, attention, behavior, and behavior disorders (Perou et al., 2013; Ghandour et al., 2019). Comorbidity of mental health issues and substance abuse disorders are also shown to significantly increase the risk for youth suicide and suicidal behavior (Goldston et al., 2009). Notably, depression is strongly linked to youth suicidal thoughts and behaviors (Nock et al., 2013). Results from a national survey show the percentage of youth aged 12–17 years who experienced a past year major depressive episode increased from 9% in 2004 to 15.7% in 2019 (SAMHSA, 2020). In a study comparing suicidal behavior and non-suicidal behavior in youth with mental health conditions, a depression diagnosis was associated with a sixfold greater likelihood of suicidal ideation and attempts, independent of other diagnoses (Nock et al., 2013).

Previous suicidal behavior is one of the most significant predictors of a future suicide attempt (Horwitz et al., 2015; Czyz & King, 2015). In a longitudinal study among youth receiving psychiatric emergency services, a history of suicide attempt was associated with a 4.8-fold increase for future attempts in an 18-month follow-up period (Horwitz et al., 2015). A subsequent study of 13–17-year-olds hospitalized for suicidal behavior found youth with persistent suicidal ideation in the 12 months after discharge were two times as likely to attempt suicide relative to youth whose suicidal ideation declined (Czyz & King, 2015). These findings point to the critical role of transition planning and a continuum of suicide care post-hospitalization for high-risk youth (see Thomas et al., Chap. 15, this volume).

Alcohol/Substance Abuse

Alcohol and substance abuse disorders contribute substantially to the risk for youth suicide (McManama et al., 2014; Liu et al., 2014). In a study of youth aged 12–15 years, alcohol use did not differentiate suicidal youth from non-suicidal youth; however, relative to youth with suicidal ideation, youth who attempted suicide had significantly more frequent alcohol use (McManama et al., 2014). Illicit drug use is also shown to significantly increase the risk for suicide attempts among youth, as well as the transition from ideation to attempt (Liu et al., 2014; Gobbi et al., 2019). In a study examining suicide attempts in intravenous and non-intravenous illicit drug users aged 12–17 years, the odds of suicide attempt were three times as high among youth with a history of using by injection, compared to those who used the same substances through different methods (Liu et al., 2014).

Family Factors

Several family-related factors have been linked to youth suicide. A prospective study examining the familial transmission of suicidal behavior revealed offspring of parents with a history of mood disorders and suicide attempts had a fivefold increased odds of suicide attempt (Brent et al., 2015). An additional study of children aged 9–10 years found family conflict and low parental monitoring were significantly associated with suicidal ideation even after controlling for demographic and psychosocial variables (DeVille et al., 2020).

Studies further indicate parental loss from death, divorce, or abandonment increases the risk for suicide. In a sample of high school-aged youth, Timmons et al. (2011) examined the association between suicide attempts, feelings of belonging, and parental displacement, defined as a separation from parents or substantial disruption in the parent/child relationship. Results showed youth who experienced parental displacement and low feelings of belonging had the highest rates of suicide attempts (Timmons et al., 2011).

A large body of research suggests child maltreatment is a significant risk for youth suicide (Angelakis et al., 2020; Cha et al., 2018; Gomez et al., 2017). A study in youth aged 13–18 years found experiences of childhood abuse were associated with a 5.1 and 5.8 increase in suicidal ideation and attempt, respectively (Gomez et al., 2017), while a meta-analysis examining child maltreatment and youth suicidal behavior found sexual abuse was the most significant predictor of suicidal behavior (Angelakis et al., 2020). Youth with a history of sexual abuse were four times more likely to attempt suicide compared to youth who experienced other forms of abuse or neglect (Angelakis et al., 2020).

Bullying

Bullying victimization and offending have also been identified as important risk factors for youth suicide (Koyanagi et al., 2019; Alavi et al., 2017). Using data from 48 countries, a global study found bullying victimization was associated with a threefold increased odds for a suicide attempt among youth aged 12–15 years (Koyanagi et al., 2019). An additional study assessed bullying and suicidal ideation in patients aged 12–17 years presenting to an emergency department with mental health issues (Alavi et al., 2017). Slightly more than 75% of youth indicated they experienced bullying at some point during their lives. Findings further revealed that victims of bullying were nine times more likely to report suicidal ideation than youth with no history of bullying (Alavi et al., 2017).

Media/Social Media Effects

There is increasing evidence that time youth spend online and using social media can influence suicidal behavior but that these associations are complex. Duration of use and how content is engaged by youth is highly relevant. A systematic review investigating social media/internet use and suicide attempts in youth aged 11–18 years found more frequent social media/internet use was associated with increased odds (1.03–5.10) for suicide attempt (Sedgwick et al., 2019). The same review highlighted cyberbullying and sleep disturbance as potential mediating factors for this association. In an additional review, up to 25% of studies suggested positive aspects of social media/internet use, revealing youth with a history of suicidal behavior used the internet as a form of support and sense of community to seek help and connect with others (Marchant et al., 2017).

Another concern is media contagion effects, referring to the media's direct and indirect influence on youth suicidal behavior. Recent studies indicate that sensational reports on the suicide of a celebrity that disregard reporting guidelines (Niederkrötenhaler et al., 2020) and irresponsible fictional accounts of suicide such as those found in *13 Reasons Why* Season 1 (Bridge et al., 2020) may increase the rate of suicides in the population. Dunlop et al. (2011) examined contagion effects associated with online platforms and whether internet sites and social media exposed youth to information that might increase suicidal ideation. Among youth aged 14–21 years, 79% reported being exposed to suicide-related content through family, friends, and traditional media and 59% through online sources (Dunlop et al., 2011).

Conclusions/Implications

This brief review of epidemiology and recent trends in youth suicide highlights the need for future research aimed at identifying mechanisms related to individual, family, and social influences that increase risk of suicidal thoughts and behavior. Suicide

prevention strategies that take both sex and developmental level into consideration and incorporate a culturally informed approach are critical. Evidence further supports the need for prevention efforts that address the distinct needs of sexual and gender minority youth and include improvements in lethal means restriction, abuse prevention, and targeted interventions to improve family and peer relations for vulnerable youth.

While epidemiology has played a critical role in suicide surveillance, risk identification, and intervention development to reduce youth suicide, opportunities exist to advance existing research methods to better inform suicide prevention strategies. Innovative data analytical techniques such as machine learning (see Wang et al., Chap. 3, this volume) and other applications of artificial intelligence are shown to more accurately predict suicide risk and identify individuals at the greatest need for intervention (Navarro et al., 2021; Walsh et al., 2018). Genome-wide association studies also offer a novel approach to suicide risk assessment by potentially detecting genetic variations that contribute to suicidal behavior (Kimbrel et al., 2018; Perlis et al., 2010). Given the recent increases in preteen suicide rates, psychological autopsy studies can provide insight into specific risks associated with this age group to support early intervention (Ruch et al., 2019). Lastly, the field of epidemiology may be uniquely positioned to address health inequities. Future efforts involving more diverse population data and comprehensive healthcare information can help target services for potentially high-risk underserved youth.

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